Foreign Animal Disease Report

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Animal and Plant Health Inspection Service
Veterinary Services

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Current Events

Vesicular Stomatitis in Eight Western States

An outbreak of vesicular stomatitis has APHIS veterinarians checking for the disease in more than 1,000 animals and 30 humans in 9 Western States.

Colorado, Wyoming, New Mexico, Utah, Arizona, Montana, Nebraska, North Dakota, and Idaho are experiencing outbreaks of the disease, which causes blister-like lesions in cattle, horses, sheep, swine, and other animals, as well as humans.

APHIS has been involved because vesicular stomatitis cannot be clinically distinguished from foot-and-mouth disease.

The USDA veterinarians have checked 552 ranches and feedlots in the affected States. They confirmed the disease in 393 animals. More laboratory tests are in progress.

The current outbreak involves the New Jersey strain of vesicular stomatitis. The disease is ordinarily short-lived and not fatal to sick animals.

The disease generally reoccurs within a region every 10 to 15 years. It most often occurs in low-lying areas, marshes, swamps, and areas with slow-moving streams after periods of heavy rainfall and high humidity. These are ideal environments for high populations of mosquitoes and gnats that may spread the disease. The reservoir for the virus is not known.

Humans can be affected by the virus, especially those working with cattle and horses in the epidemic areas, as well as laboratory workers. Human symptoms include blisters on the lips, tongue, and feet and flu-like signs of the respiratory tract. Humans were only mildly affected in the current outbreak. (APHIS News, 202 447-6315)

APHIS Tests Disease Eradication Capability

USDA recently concluded a week-long test to measure its capability to wipe out a foreign animal disease invasion. For the test, regional task forces were activated in Florida and Texas to fight an imaginary disease--NADA--which means nothing in Spanish.

"This sort of test is essential if we are to be prepared against the very real threat of potentially disastrous foreign livestock and poultry diseases," said Dr. Harry Mussman, Administrator of APHIS.

The test exercise was coordinated from the APHIS Emergency Disease Information Center, a "war room" and communications center located in Hyattsville, Md.

The test simulated the introduction of NADA with a planeload of illegal drugs into a pasture in central Florida. Feral swine became infected by eating food scraps. The disease passed to swine and cattle. The disease then spread to nearby farms and through cattle movements to a Texas feedlot.

Actual disease eradication activities were reproduced to the fullest extent possible, short of interrupting livestock and milk marketing and slaughter operations.

Veterinarians, technicians, and support personnel were actually mobilized. Staff represented APHIS, State, military, fish and game agencies, and others. Observers were on hand from foreign nations and several industry groups. (APHIS News, 202 447-6315)

Parafilaria Vector Found

On August 31, 1982, Veterinary Services was notified of the interception and identification of a potential immigrant pest fly, Musca vitripennis. One adult male was found on July 27, 1982, at McGuire Air Force Base, New Jersey. A Plant Protection and Quarantine (PPQ) inspector collected the specimen in the cargo terminal from a wooden crate which originated in the Azores.

The specimen was submitted to the Agricultural Research Service (ARS) as part of a regular PPQ interception. The ARS Systematic Entomology Laboratory in Beltsville subsequently identified the fly.

This species of fly is a vector of a parasitic nematode. The nematode is the causative agent of hemorrhagic bovine parafilariasis, a serious disease of cattle in some parts of the world. Sweden is experiencing an epizootic of the disease in cattle. An average loss of 15 pounds per carcass is attributed to the disease in that country.

A preliminary survey to determine if M. vitripennis is established in New Jersey was completed in September 1982. (Dr. D. D. Wilson, 301 436-8087)

Denmark FMD Update

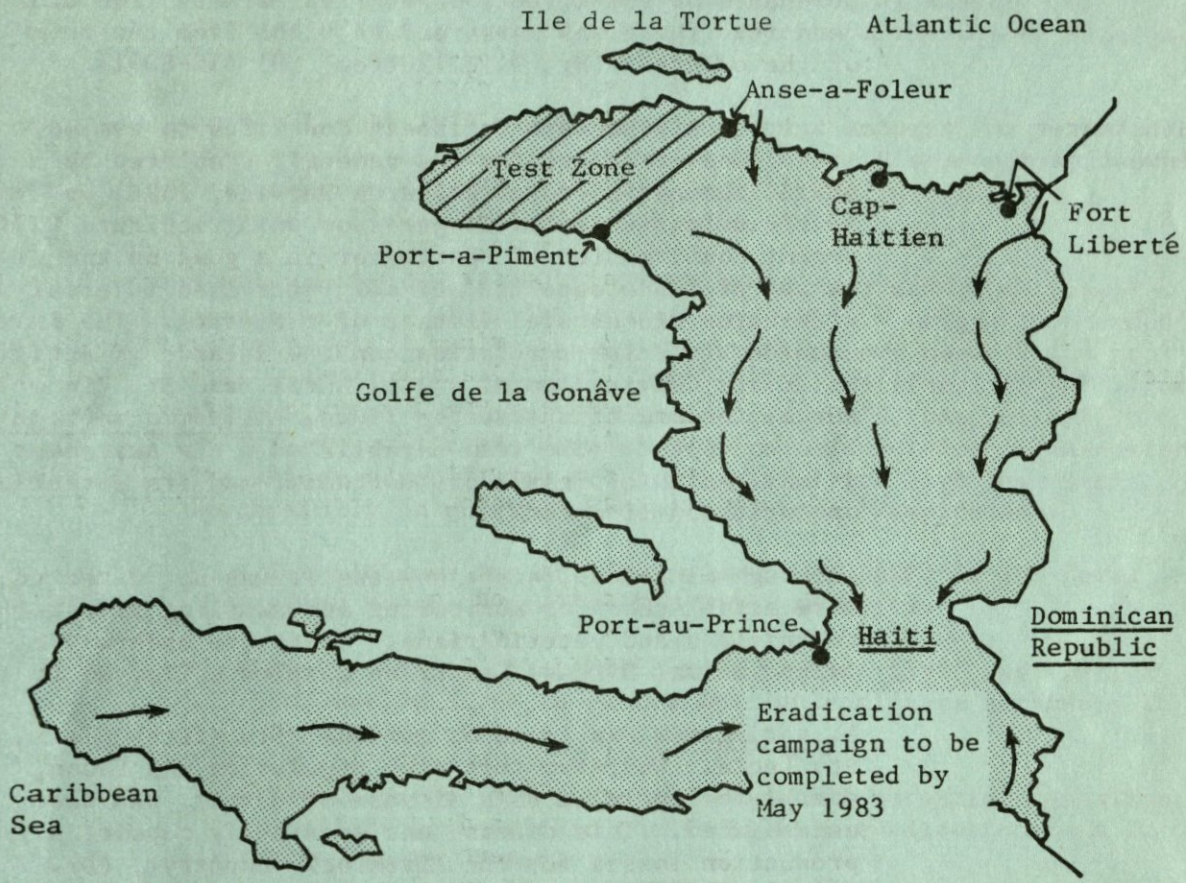
The outbreak of foot-and-mouth disease (FMD) in Denmark, reported in the June 1982 issue of FAD Report (Number 10-1,) seems ended with the elimination of the last infected cattle on May 4, 1982.

A total of 4,100 livestock on 22 premises was depopulated in a campaign that began with the diagnosis of FMD in cattle on the island of Funen, March 18, 1982. All affected premises were cleaned and disinfected under veterinary supervision. Direct cost of the eradication effort exceeded $2.5 million.

Blood serums collected from Danish cattle, swine, sheep, and deer have not reacted to laboratory tests for FMD antibodies, suggesting the virus was eliminated from that country. Restocking of depopulated farms was scheduled to begin during the second half of August 1982. (Dr. K. A. Hand, 301 436-8065)

Haitian ASF Program Update

The cooperative program to eradicate African swine fever (ASF) from Haiti, reported in the June 1982 issue of the FAD Report (Number 10-1), eliminated all swine from an initial test zone. That zone occupies the extreme northwestern peninsula, west of a line extending from Anse-a-Foleur on the northern coast, to Port-a-Piment on the Golfe de la Gonâve. Operations began May 11 and were completed July 22.



Arrows on map represent direction of progress by eradication brigades.

Haitian brigades with 13 U.S. and 4 Canadian cooperators are continuing eastward from the test zone, by establishing operational fronts at Cap-Haitien and Fort Liberté, from which they will proceed southward. Swine on the Ile de la Tortue, off the northern coast, will be eliminated in the first weeks of this phase of the program. Fronts will be established on the southwestern peninsula in November, to begin the sweep eastward. All swine are to be eliminated from Haiti by May 1983.

Swine are purchased by the eradication brigades at the time of slaughter, and the meat is returned to the owner for local consumption. A total of 26,369 swine had been eliminated by August 1, 1982.

The Government of Haiti began paying compensation for swine killed along the frontier in 1979. (Dr. L. Bartelt and Dr. S. T. Wilson, Jr., 301 436-8097)

Velogenic Viscerotropic Newcastle Disease

Even though there has been no velogenic viscerotropic Newcastle disease (VVND) in commercial poultry of the United States since 1974, the disease crossed our borders in smuggled pet birds in each subsequent year except 1976. VVND virus was identified in pet birds and eliminated at five different locations this summer: Norwalk, Calif., May 31; Chula Vista, Calif., June 10; San Diego, Calif., June 14; Cardiff, Calif., July 21; and Grand Prairie, Tex., July 24. All of the infected birds had been purchased on the streets or at flea markets from unidentified vendors. There was no spread of virus from the premises of any of the owners. (Dr. W. E. Ketter, 301 436-8091)

Heartwater Investigation

A trip to six Eastern Caribbean countries to evaluate the prevalence of heartwater was recently completed by a team from APHIS, the Agricultural Research Service, (ARS) and the Inter-American Institute for Cooperation on Agriculture (IICA). The recent confirmation of heartwater in a goat on the Caribbean island of Guadeloupe has markedly increased interest in this tick-borne rickettsial disease of ruminants. The investigators sampled high-risk populations on the islands of Antigua, St. Kitts, Nevis, Dominica, St. Lucia, and St. Vincent. A survey for one of the vector ticks, Amblyomma variegatum, was also conducted. The team established a new awareness in local animal health officials of heartwater and its potential impact on Caribbean livestock.

Although classical, acute heartwater was not detected, plans were established for monitoring and sampling livestock by local technicians and veterinarians. Tests are underway at Plum Island Animal Disease Center on samples collected in the field.

A. variegatum was found on Antigua, St. Kitts, Nevis, and St. Lucia. Wherever this tick population was found, streptothricosis, a skin disease of cattle, was also established. This disease was apparently causing significant production losses for the livestock industry. (Dr. L. J. King, 301 436-8087)

Suspected Foreign Animal Diseases

A total of 103 occurrences of unusual animal disease conditions in 31 States was investigated by specially trained APHIS Foreign Animal Disease (FAD) diagnosticians during the period of October 1, 1981, to June 30, 1982. Involved in the 103 investigations were 35 pet birds and poultry, 23 cattle, 22 swine, 11 horses, 5 sheep, 4 goats, and 3 deer. (Dr. W. E. Ketter, 301 436-8091)

CEM Update

New York has become the ninth State approved by USDA officials to receive stallions imported from countries affected with contagious equine metritis (CEM), a venereal disease of horses. Other States approved to receive stallions are California, Colorado, Kentucky, Maryland, North Carolina, Ohio, South Carolina, and Virginia. New York's animal health regulations provide for the required post entry inspections, testing, and precautionary treatments necessary to prevent the introduction of the disease.

These requirements are in addition to USDA-required testing and inspection in the nation of origin and at the U.S. port of entry animal import center. Stallions will remain under quarantine at the premises of destination until all testing and treatments are completed.

The only cases diagnosed in the United States have been in Kentucky and Missouri. Nations considered infected are Australia, Austria, Belgium, Denmark, Federal Republic of Germany, France, Ireland, Italy, Japan, and the United Kingdom. (Dr. D. E. Herrick, 301 436-8530)

Wildlife Studies

On October 1, 1978, APHIS entered into a cooperative agreement with the Southeastern Cooperative Wildlife Disease Study (SCWDS) to integrate wildlife disease surveillance into existing livestock disease-related programs.

SCWDS has led the field of wildlife disease and parasitologic investigations since its inception in 1957. Originally funded by 13 Southeastern States of the Southeastern Association of Fish and Wildlife Agencies, SCWDS, with additional support from the U.S. Fish and Wildlife Service and APHIS, has evolved into a multipurpose wildlife disease research and service organization. The unique capabilities of this organization have been used successfully on numerous occasions. Some examples are:

- Surveillance for African swine fever (ASF) in the feral swine of the Dominican Republic and Haiti.
- Evaluation of the limited role of free-flying psittacine and native birds in exotic Newcastle disease outbreaks in California, Florida, and Hawaii.
- Cattle fever tick surveillance on all potential mammalian wildlife hosts within the fever tick eradication zone in Webb County, Texas.
- Monitoring wildlife health during a field test of the screwworm adult suppression system in Aldama, Mexico.
- Evaluation of wild swine populations for hog cholera and other swine diseases in 11 Southeastern States.
- Vesicular stomatitis (VS) surveillance among all significant wild and domestic mammal populations and selected wild avian species on Ossabaw Island, Georgia.
- Annual bluetongue and epizootic hemorrhagic disease surveillance among white-tailed deer in 16 Southeastern States.

One of the more recent SCWDS field projects involved collecting blood samples from 1,642 swine in 102 locations throughout Haiti. Serologic results showed that ASF is well established throughout Haiti, with seropositive swine detected in virtually

all regions of the country. In response to a request from APHIS, SCWDS personnel are assisting the Haitian ASF task force in various aspects of the eradication program.
(Dr. F. A. Hayes, 404 548-1032)

OIE Meeting

The 50th General Session of the Office of International Epizootics (O.I.E.) was held the last week of May in Paris, France.

With more than 100 member countries, O.I.E. is the international organization of chief veterinary officials.

The primary function of O.I.E. is to gather and report on the animal health situation in the world. Disease outbreaks are reported to O.I.E. and disseminated to other countries. In addition to gathering and disseminating information on animal diseases and reporting outbreaks, O.I.E. serves as the international organization where veterinary officials attempt to establish procedures for movement of animals and products between countries without spreading diseases.

Dr. J. K. Atwell, Deputy Administrator for APHIS Veterinary Services, was elected Secretary General of the "Zoo-Sanitary Code Commission" at the May meeting.

There are four standing commissions that work to establish standards for use as recommended procedures. These commissions are "The Norms Commission," which establishes recommended laboratory tests and requirements for veterinary biologics; "The Zoo-Sanitary Code Commission," which works on recommended standards for animals and products movements; "The Foot-and-Mouth Disease Commission;" and "The Fish Disease Commission."

In addition, there are several working groups that function similarly to the permanent commissions, but with a fixed time and are abolished when their work is completed. New working groups are established when new problems develop and a need is identified. There are four regional commissions, one each for Europe, Africa, the Americas, and Asia-Oceania.

The General Session is held each year in May at the headquarters of the organization in Paris. The General Session consists of presentations of technical and scientific papers in areas of concern to animal health officials. The plenary sessions this year covered rabies, Rift Valley fever, and respiratory diseases of small ruminants. The topics, presented by a reporter, consisted of information gathered from several experts in the field. The intent is to give animal health officials an up-to-date look at animal diseases that are of general concern in a large number of the member countries.

General topics selected for next year were genetic engineering, tuberculosis, and salmonella.

The General Session gives the veterinary officials a chance to review the animal health status of all countries of the world, an update on several topics of concern, and a chance to have input into establishing procedures for movement of animal

products and biologics. The regional commissions develop topics of regional concern during their meetings, and there are many chances to discuss problems among veterinary officials of various countries.

The O.I.E. is in many ways similar on an international level to the United States Animal Health Association (USAHA) at the national level. The various commissions make recommendations for consideration by the General Session. These recommendations are suggested for adoption by the member countries. Each country has one vote in the General Session. The regional commissions function similarly to the regional committees in the USAHA.

Over the years, O.I.E. has steadily improved its reporting procedures and constitutes in some instances the only source of disease information from several countries.

The United States has been a member of O.I.E. for several years and has membership in two of the four permanent commissions. The United States is also a member of two of the regional commissions--the Americas and Asia-Oceania.

O.I.E. is the only forum in the world where the chief veterinary officials meet in a body to discuss mutual problems. Much good comes from the discussions about the disease situation in the various countries and from the face-to-face contact between various veterinarians on an individual basis about specific problems. (Dr. J. K. Atwell, 202 447-5193)

FMD Vaccine Bank

A Cooperative Agreement to establish a North American foot-and-mouth disease (FMD) vaccine bank was developed early in 1982 by Canada, Mexico, and the United States. USDA Secretary John R. Block and Mexican Minister of Agriculture and Livestock Francisco Merino Rabago signed the agreement, which was then forwarded for Canadian approval.

About 7 million doses of FMD antigen are currently available from the vaccine bank, including six of the different antigenic types considered most threatening to the participating countries. (These are types A5, A24, A27, C1, C3, and O1.) The antigen on hand would fulfill immediate needs and buy time to produce additional vaccine of the specific type required.

Vaccination is considered a second line of defense against FMD, should this costly disease of cloven-hoofed animals enter and extend beyond our resources to eliminate it. Vaccination can reduce immediate economic losses from FMD and slow its spread. Once started, vaccination must be continued indefinitely to guard against the virus that would continue to replicate and spread among the immunized animals.

Should FMD be diagnosed in the United States, a depopulation policy will be immediately implemented to eradicate all foci of infection. Vaccination will be considered under one or more of the following conditions:

- There is an inability to contain the outbreak with the slaughter of infected and exposed animals.

- The geographical area of FMD occurrence is so great that it is impractical to continue with a slaughter program.
- The total cost-benefit ratio of the slaughter program is not economically feasible.
- There is sabotage making any other action inappropriate.
- Legal restriction by a U.S. court prevents carrying out the program to depopulate infected and exposed herds.

Not more than 50 percent of the doses of any one subtype on hand may be withdrawn from the vaccine bank by a member country.

A member country using the vaccine bank is responsible for all replacement costs for vaccine used and must provide funds to replace the vaccine within 30 days.

The cost of preparing the stored antigen for actual use must be paid by the user.

A country that is not a member of the vaccine bank may use it only if the situation there constitutes a direct threat of FMD to a member country, Central America, or the Caribbean islands, and the requesting country is willing to pay for it. Such a request would require approval by the bank commissioners. (Dr. W. W. Buisch, 301 436-8073)

APHIS Converts Foreign Jobs to New Category

APHIS has been granted authority to convert 125 positions to the foreign service (FS) personnel system. This authority was granted under a Presidential order that permits APHIS to join with USDA's Foreign Agriculture Service in having personnel under the FS system.

Conversions of positions currently located in foreign countries are now in progress and will become effective January 1, 1983.

APHIS people joining FS after the conversion period will be required to pass a complete physical and security clearance and must certify that they are available for worldwide assignment. These positions will include administrators at headquarters and APHIS employees in Mexico, Central and South America, Europe, Asia, and Africa.

The people who make up the new foreign service will be highly mobile and available for long-term service in any part of the world. "Precleared," they can be assigned to posts abroad as soon as the need arises. (APHIS News, 202 447-6315)

World Situation Update

Animal diseases exotic to the United States were reported only in their endemic areas of the world during early summer of 1982.

Outbreaks of **foot-and-mouth disease** reported earlier this year are now considered eradicated by the Government of Denmark. FMD was also reported in East Germany, West Germany, Spain, Turkey, Egypt, Kenya, Libya, Nigeria, Argentina, Colombia, Paraguay, Uraguay, and Venezuela.

Rinderpest was reported only by Niger and Nigeria; **lumpy skin disease** by South Africa and Burundi; and **sheep pox** and **goat pox** by Kenya, Libya, Morocco, Iran, Kuwait, and Turkey.

African horsesickness has not invaded new territory for some time, remaining in South Africa and Namibia.

Glanders was reported by Turkey, and **dourine** by Italy and Namibia.

Hog cholera continues to persist in Colombia, Paraguay, Korea, Hong Kong, Greece, Italy, Portugal, Belgium, and the Netherlands. An apparent spillover of the disease from Belgium to Holland, following an extended period of its absence there, required the elimination of 20,000 swine.

African swine fever was reported by Angola, Spain, Portugal, Italy (Sardinia), and Haiti.

Contagious bovine pleuropneumonia was found in two herds in France earlier this year. Angola, Nigeria, and Kuwait also reported this disease. (Dr. H. J. Seyffert, 301 436-8285)

Focus on... Rift Valley Fever

Rift Valley fever (RVF) is an acute, febrile, arthropod-borne viral disease primarily of sheep, goats, and cattle. The disease often causes high abortion rates and a high rate of neonatal death in lambs, kids, and calves. Younger animals are most susceptible. Those less than 1 week of age are most severely affected.

Humans are also highly susceptible, responding to RVF virus with an acute febrile, dengue-like illness. Severe cases, complicated by hemorrhage, jaundice, meningoencephalitis, retinitis, and death have also been encountered.

Cause

RVF is caused by a pantropic, arthropod-borne, RNA virus of the family Bunyaviridae, of the phlebotomus fever group. Its size reportedly ranges from 30 to 94 nm in diameter; although most workers indicate it is 90 to 94 nm. Neurotropic variants have been obtained by intracerebral passage in mice. RVF virus is most stable within a pH range of 7 to 8. It is rapidly inactivated below pH 6.2, even when frozen at -60°C. The virus has survived for many years in serum or blood stored at or below -60°C. In media containing whole serum it loses titer, but can be recovered after 3 hours at 56°C and 21 days at 37°C.

History and Geographic Distribution

RVF was first described in sheep in the Great Rift Valley of Kenya during 1931. The virus was isolated in 1948 from several species of mosquitoes in the Semliki Forest of Uganda. In 1950-51, a major epizootic occurred in South Africa and another in southern Zimbabwe (formerly Rhodesia). South Africa experienced a second epizootic of RVF in 1975, as did Zimbabwe. In 1977 an outbreak in Egypt spread from Aswan to the southeastern Nile Delta within a 3-month period. By 1978 it had

extended throughout most of the country. About 70 percent of the human population was infected in some of the more severely affected geographic areas. RVF has not been reported outside Africa, although its spread to the Sinai Peninsula has been suspected.

The incidence of RVF has varied from one area of a country to another. Incidence also has varied among the domestic hosts on the same or adjacent farms; for example, cattle were affected on one farm and sheep on another.

Host Range of Rift Valley Fever Virus

4+	3+	2+	1+	--
*Lambs	Humans Sheep	Goats Camels Buffaloes	Cattle	Swine
*Kids	Calves (more than 1 week old)	Monkeys (Indian & S. American)	Cats	Chickens Guinea Pigs Rabbits
*Calves	Rats (some species)	Rats (some species)	Dogs Horses	
*Puppies	Buffaloes Cattle	Grey Squirrels	Monkeys (African)	Hedgehogs
*Kittens				Tortoises Frogs
White Mice Hamsters Field Mice Dormice Field Moles				Canaries Pigeons Parakeets

4+= nearly 100% fatal
3+= severe illness with some mortality
2+= severe illness, abortion in animals, and viremia of disease
1+= abortion, viremia, some illness to no overt signs
--= refractory to natural diseases and, in those species tested, to laboratory infection

* Less than 1 week old

NOTE: It is likely that with extensive laboratory testing, the very young of several species noted above would fall under the 4+ classification. Also, based upon recent data from epizootics of the 1970's, humans, buffalo, and cattle have been placed under the 3+ column.

Hosts

RVF affects sheep, goats, cattle, buffaloes, and camels. Other susceptible hosts include dogs, cats, various rodents, some nonhuman primates, and man. The horse may become infected but displays no signs of the disease and is not involved in transmission. Swine are extremely resistant. Guinea pigs, rabbits, hedgehogs, tortoises, frogs, chickens, canaries, pigeons, and parakeets are resistant.

Transmission and Epizootiology

RVF is primarily arthropod-borne. Mosquitoes usually transmit RVF virus biologically by intrastadial feeding. Biting midges of the genus Culicoides and ticks are possible but unproven vectors. Epizootiology of RVF is complicated by the ability of the virus to spread by aerosol and by direct contact of susceptible hosts with blood, urine, or meat of infected animals. Outbreaks of RVF have often been associated with years of high rainfall and high population densities of certain mosquito species. The virus has been isolated from species of the genera Aedes, Culex (including C.pipiens), Mansonia, Eratmopodites, and Anopheles. Many species of mosquitoes in the United States are potential biological vectors of RVF virus. For example, Culex pipiens, the species incriminated as the principal vector during the Egyptian outbreak of 1977-80, commonly occurs throughout the United States. The existence of a wildlife reservoir of RVF was suggested by the 1948 isolation of the virus from an area of Uganda where there were no humans, sheep, or cattle. Rodents are suspected, but unproven, reservoir hosts of RVF virus.

Signs and Lesions

An epizootic of RVF is characterized by a high rate of mortality in lambs, calves, kids, and puppies less than 7 days old, and mild or inapparent disease in adult animals. A low rate of mortality and a high rate of abortion may be seen among cows, ewes, and bitches. Necrotic liver lesions are often seen on post-mortem examination. A nondescript, influenza-like or dengue-like illness may be seen in humans exposed to infected animals or specimens.

RVF primarily affects the liver, causing foci of necrosis. These may be observed with the unaided eye in most cases, but may be only microscopic in some. Yellowish discoloration of the liver, without swelling, is frequently found in infected lambs, and similar but less severe lesions are produced in cattle and adult sheep.

The peracute form of RVF is usually seen among very young lambs, calves, and kids. There is a marked febrile reaction, restlessness, poor appetite, and inability to stand. Death usually ensues within 36 hours of the onset of observable signs. Mortality may approach 95 to 100 percent in affected lambs and 70 percent in young calves. Changes seen at necropsy usually include severe hepatitis, usually with focal necrosis, widespread petechial hemorrhages or ecchymoses, and hemorrhages in the large intestine and peritoneal and thoracic cavities. The microscopic changes seen in the liver are considered characteristic of the disease in all affected species.

The acute form of the disease is usually seen in young lambs and occasionally in adult sheep. There is fever, rapid pulse,

unsteady gait, vomiting, a greenish muco-purulent discharge from the nostrils, and sometimes hemorrhagic diarrhea. Death may occur within 48 hours after the onset of observable signs. Mortality is very high in lambs and calves, but in adults it is usually between 20 and 30 percent. In adult sheep and cattle, there is usually transient fever, inappetence, muscular weakness, decreased milk yield in lactating females, and sometimes fetid diarrhea. Pregnant sheep and cattle usually abort.

The subacute form is usually seen in adult sheep and cattle. There is fever lasting 24 to 90 hours, inappetence, and general weakness. Abortion is common. About 20 percent of the pregnant ewes that abort die soon afterwards.

Laboratory Tests

Histopathologic examination nearly always reveals the characteristic liver necrosis in all animals, regardless of species. The extent of necrosis varies with species and age of the animal. Myocarditis and meningitis are accompanying changes in some cases.

Virus isolation should always be attempted, using specimens taken during the febrile period of the disease. These should include whole blood or plasma and liver. Several procedures are available for virus isolation, including the inoculation of mice and hamsters and 1- or 2-day-old lambs. Mice should always be included to aid in a differentiating RVF from bluetongue. Embryonated eggs and any one of several cell culture systems may also be inoculated, followed by virus identification with fluorescent-labeled RVF antibodies.

Fluorescent antibody techniques may also be applied directly to post-mortem specimens that have been frozen at dry ice temperatures. Specimens should include liver, spleen, and brain of animals killed during the febrile period of the disease. Decomposed specimens are generally unsatisfactory for virus isolation and direct fluorescent antibody tests.

Serologic tests may be used to identify the RVF virus and determine the extent of spread of the disease geographically, but should be considered unreliable in establishing an early diagnosis at the beginning of an outbreak or epizootic. Paired sera, obtained during the febrile period and 21 to 28 days later, should be submitted for laboratory examination. Serum neutralization, hemagglutination-inhibition, and complement fixation tests are available for RVF. Virus neutralization by specific antiserum is diagnostic for RVF. Appropriate safety precautions must always be observed in handling material suspected to contain RVF virus, since it is highly infectious for humans.

Differential Tests

Histologic examination of the liver, serum neutralization tests, and mouse inoculation tests may be used to differentiate RVF from enterotoxemia of sheep. RVF virus readily kills mice of all ages after inoculation by the intraperitoneal route.

Mouse inoculation, using adult mice and the intraperitoneal route, and serum neutralization tests may be used to

differentiate RVF from bluetongue. The bluetongue virus can, on occassion, experimentally infect via the intracerebral route of inoculation.

Sudden onset of ephemeral fever or three-day sickness and its specificity for cattle help to differentiate this disease from RVF. Other differentiating features include short duration of fever followed by lacrimation, watery nasal discharge, lameness, and general stiffness. Animal inoculation and serological tests may be used to confirm a diagnosis of ephemeral fever.

The disease in sheep caused by Wesselsbron virus is similar to RVF clinically, pathologically, and epidemiologically. Diagnosis requires laboratory methods. Wesselsbron virus is antigenically distinct from RVF virus. Swine, guinea pigs, and rabbits are susceptible to Wesselsbron virus, whereas these animals are refractory to RVF virus. Wesselsbron virus has been isolated from dead lambs in the Orange Free State in South Africa, from human blood, and from mosquitoes in Northeast Natal and Cape Province, South Africa. There is also serological evidence that it exists in the northern African country of Chad.

Brucellosis, vibriosis, trichomoniasis, Nairobi sheep disease, and ovine enzootic abortion should also be considered in the differential diagnosis of RVF, since abortion is sometimes the only significant sign of RVF, especially in cattle.

Public Health Aspects

Humans may be readily infected by handling infected material. Laboratory infections have apparently resulted from contact and inhalation. The virus may gain entrance through the broken skin or mucous membranes. Many veterinarians who have conducted necropsies on diseased animals have contracted the disease. Farmers who have tended flocks and herds having RVF and butchers, delivery boys, and housewives who have handled infected meat have been infected. Infection probably does not spread from person-to-person by contact, although the possibility of such an occurrence cannot be excluded because the virus may be shed in the saliva.

RVF is similar to influenza and dengue fever in its ability to cause a sudden onset of fever (38.8° to 40°C), headache, muscular pain, weakness, sensation of fullness over the liver, rigor, vertigo, photophobia, and nausea. The incubation period in humans is from 4 to 6 days. Severity of the disease varies from inapparent infection to complete debilitation. The disease is fatal in less than 1 percent of human infections. Malaise, weakness, and complaints of headaches and defective vision may persist for several weeks. Pain in the extremities and joints may be extreme. There is usually a feeling of discomfort in the epigastrium and definite tenderness or ever abdominal pain may be present. The face may be flushed and the conjunctiva injected. The temperature curve is, as a rule, of the saddleback type, thus resembling that of dengue and yellow fever. Convalescence is usually rapid and recovery complete. However, serious sequelae may result in some instances, including thrombophlebitis, retinopathy affecting the macula, and retinal detachment.

Chemotherapy	Specific chemotherapeutic treatments for RVF are not available.
Vaccines	Live attenuated, and formalin-inactivated RVF vaccines have been developed for veterinary use in South Africa and Egypt. A highly effective vaccine for RVF is available in the United States for human use only. This is an inactivated tissue culture vaccine produced under direction of the U.S. Army at Ft. Detrick. This product has an Investigational New Drug Permit for human use and is very effective. It was found effective in experimental animals at PIADC.
Prevention and Control	Livestock should be protected from RVF by avoiding contact with infected animals and excluding vector arthropods. Prevention of transmission of RVF virus by mosquitoes and other arthropods requires insect control on individual premises and area control through broad application of insecticide. Susceptible, normal animals should be moved from sites with high populations of arthropod vectors, when possible. (Dr. D. D. Wilson, 301 436-8087)

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